COVID-Related Skin Manifestations:

A Medical-Legal Perspective

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With the arrival of the novel coronavirus, otherwise known as COVID-19, the world as we knew it changed. The human race and medical field had to adapt to the unprecedented assault this virus launched on the human body and on humanity. Various terminology like cytokine storm, long-hauler, super-spreader, and COVID toes became prevalent on social media, news outlets, and amongst healthcare personnel. Additionally, various skin and wound disorders were observed and reported by members of the wound community, which were not readily recognized by the members of the medical community lacking training in skin and wound care. This lack of recognition can result in an incorrect understanding of the skin disorders and tissue failure resulting in wound disorders caused by COVID-19, thus leading to wrong diagnosis and the ripple effect beyond.

According to the Centers for Disease Control and Prevention's (CDC) COVID-19 Timeline, January 17, 2020, the first reported case of 2019-nCOV occurred in the United States. On January 18, 2020, samples were taken, and COVID was confirmed by a lab on January 20, 2020, in Washington state (CDC, 2022). By the end of 2020, approximately 20,000,000 total cumulative cases were confirmed in the United States, and more than 54,000,000 confirmed cumulative cases by the end of 2021 (CDC, 2020). Additionally, the CDC reported a total of 862,494 COVID-related deaths as of January 23, 2022 (CDC, 2020).

As COVID unfolded and mutated, more information became known about its devastating effects on the human body. However, the effects of COVID vary from individual to individual, and can be dependent on comorbid medical conditions, the severity of the disease, and many other factors. Risk factors for developing severe symptoms of COVID-19 can include those with heart and lung conditions, obesity, advanced age, diabetes, weakened immune system, brain disorders, nervous system disorders, cancer, kidney disorders, and Down Syndrome, just to name a few (Mayo Foundation for Medical Education and Research [MFMER], 2022).

As the pandemic rages on, COVID-related skin manifestations have been noted and documented in COVID-positive patients of all ages, including children. The skin manifestations range from rashes to blisters and even full-thickness tissue breakdown, including destruction down to the bone. Skin manifestations have been reported in upwards of 20% of COVID cases. Descriptors of the cutaneous manifestations include terminology like "maculopapular, chilblain-like, urticarial, vesicular, livedoid, and petechial lesions" (Singh et al., 2021, p. 51). Although the exact pathogenesis of the skin eruptions and breakdown is unknown at this time, angiotensin-converting enzyme 2 (ACE2) has been isolated in the skin and adipose tissue at higher expression levels than other human organs. ACE2 expression was significantly higher in fibroblasts and melanocytes, two important cellular compartments in skin tissue (Singh et al., 2021, p. 51).

Various medical personnel reported and evaluated ulcers not consistent with pressure throughout the pandemic. The ulcerations can have borders described as a purpuric plaque with retiform or livedoid edges. Pathology reports of biopsies revealed underlying thrombogenic vasculopathy most likely secondary to COVID, versus frank necrosis typically observed from pressure-related injuries (Young & Fernandez, 2020) (National Pressure Injury Advisory Panel [NPIAP], 2020). In some reported cases, skin manifestations were present before symptoms of COVID appeared (Singh et al., 2021).

According to the Centers for Medicare and Medicaid Services (CMS), as published in the Long-Term Care Facility Resident Assessment Instrument 3.0

User's Manual, "a pressure ulcer/injury is localized injury to the skin and/or underlying tissue…as a result of intense and/or prolonged pressure or pressure in combination with shear" (Centers for Medicare and Medicaid Services [CMS], 2019). Of note, pressure ulcer/injury definitions may be similar across the healthcare continuum but are not universal.

With COVID-related skin manifestations, many times the skin breakdown occurs where there is an absence of pressure. For example, purpuric discoloration may occur on the buttock area, however, the COVID patient may have been positioned prone for many hours a day. The prone position may be used in a compromised COVID-19 patient to allow "for better expansion of the dorsal (back) lung regions, improved body movement and enhanced removal of secretions which may ultimately lead to advances in oxygenation (breathing)" (McCabe, 2020). When prone, no pressure is exerted on the buttock region, therefore making it nearly impossible for pressure to have causation for skin breakdown.

Additionally, the skin and tissue breakdown can be quite severe due to vasculopathy issues forming systemic coagulopathy in the tissue. Vasculopathy is most likely caused by the cytokine storm possibly resulting in "complications due to hypercoagulation and microvascular occlusion" involving the skin and tissue. With ACE2 receptors being a source of entry for COVID-19 and those receptors being expressed in vascular endothelium, accelerated and extensive clotting has been documented with COVID-19 infections (NPIAP, 2020).

Biopsies submitted for pathology were able to document the thrombogenic vasculopathy in COVID-19 positive patients with purpuric skin lesions and microvascular occlusion of vessels in the skin versus histologic specimens of deep tissue pressure injuries showing "frank necrosis of skin, fat, and muscle". For "purple areas

This activity is designed to increase understanding that COVID-19 infections can result in COVID-Related Skin Manifestations and understand how skin and underlying tissue behave during the illness to determine if a breach in care existed and what possible treatments or interventions were put in place and if treatments were appropriate.

Upon completion of the learning activity the learner will be able to:

a. Identify risk factors for developing severe symptoms of COVID-19 and skin manifestations and descriptors used in COVID-related skin manifestations.
b. Recognize the process for skin breakdown that occurs in the absence of pressure in COVID-19 patients and how vasculopathy issues are involved in skin and tissue breakdown.
c. Identify the importance of how the LNC must review records to determine proper assessment and work-up of wound etiology with diagnosis and treatments to determine if a breach in care existed.

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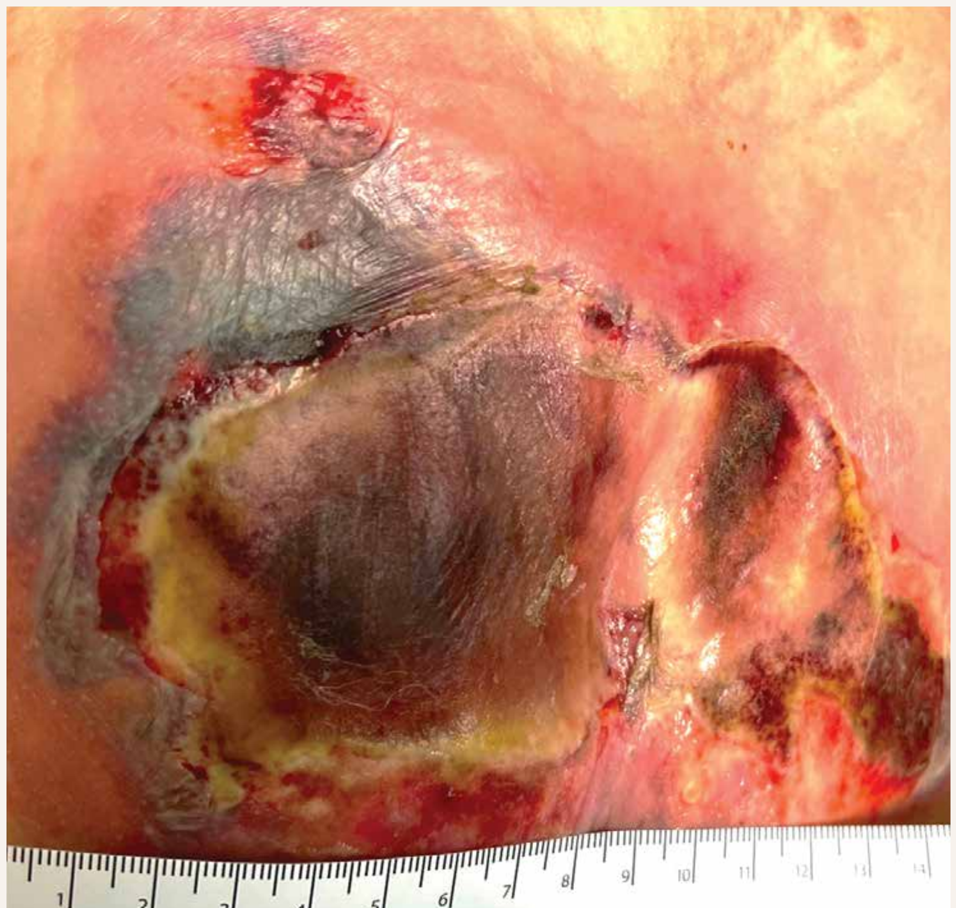

on non-pressure loaded surfaces" these areas should not be classified as pressure injuries and for purple areas where pressure is a component, further investigation is required before determining primary etiology as pressure versus COVID-related skin manifestations since skin and tissue was more susceptible to breakdown due to vasculopathy or other COVID manifestations (NPIAP, 2020).

As legal nurse consultants (LNCs), record review to determine proper assessment and work-up of wound etiology are paramount. The wrong diagnosis can have a very real ripple effect that is profound and can be catastrophic. The wrong diagnosis can lead to the wrong care plan, wrong interventions, wrong treatment, delay of appropriate referrals, wrong goals, and wrong ICD-10 diagnosis codes transmitted to payors asking for payment.

As an example, a diagnosis of a wound or skin lesion as a venous wound, usually means some form of compression would be appropriate to assist in healing. Ongoing lifetime compression is usually prescribed to prevent further venous ulcerations from developing as a standard of care. A goal of healing and preventing future wounds is reasonable if no other co-morbid medical conditions are a factor. However, if the ulcers are not venous and in fact some form of cancer, the goal would change, as would the interventions and reasonable expectation for healing. An incorrect diagnosis could delay the treatment of cancer and could have catastrophic results in the lower extremity.

An assumption by some healthcare professionals is that if a wound is over bone, it must be pressure, is an inaccurate assumption. CMS has stated for healthcare professionals to "determine that the lesion being assessed is primary related to pressure and that other conditions have been ruled out". The examples cited by CMS include arterial ulcers which "may be over the ankle or bony areas of the foot" and venous ulcers often occur in the lower leg around the "medial ankle" (Centers for Medicare and Medicaid Services [CMS], 2017).

It empowers the LNC involved in a legal case to be intimate with the regulations encompassing and governing the specific site of care. For example, the staging criteria and terminology in an acute care hospital vary compared to the staging criteria and terminology in the post-acute care setting. Much like the pressure ulcer/injury definition, the staging criteria are also not universal. The staging criteria for the practice setting may not match the ICD-10 definitions either, so understanding which criteria were utilized and if this was appropriate is also important.

Another criterion put forth by CMS in long-term care discusses understanding various skin ulcerations. CMS mandates "at the time of the assessment and diagnosis of a skin ulcer/wound, the clinician... (physicians, advance practice nurses, physician assistants, and certified wound care specialists, etc.) ...is expected to document the clinical basis which permit differentiating the ulcer type, especially if the ulcer has characteristics consistent with a pressure ulcer, but is determined not to be one" (CMS, 2017). For example, did the nurse or other staff member witness pressure at the site of ulceration, or did the staff assume the spot was caused by pressure without an investigation or thorough assessment? Understanding the basic principles of pressure ulcer/injury assessment and development can assist the LNC in record review to determine if proper clinical assessments were completed at the time etiology was determined.

COVID-related skin manifestations can be catastrophic and extensive often resulting in a full-thickness wound that can extend to muscle or bone. Listing the wound as pressure, when in fact the wound may be caused by COVID, may not change the outcome of the wound, but it could change the understanding of the patient or family. Being informed of the correct diagnosis means the patient or family can make informed decisions surrounding the diagnosis. Wrong information means the patient and family are not making fully informed decisions on care. Additionally, healthcare professionals may inaccurately list the wound goal as healable, when it may be a palliative wound due to COVID. The goals of the care plan often change the interventions.

In conclusion, understanding that COVID-19 infections can result in COVID-related skin manifestations is a good place to start in understanding how skin and underlying tissue behave during the illness. This understanding can assist the LNC in determining if a breach in care existed and what possible treatments or interventions were put in place, and if treatments were appropriate. COVID changed the landscape of healthcare and the landscape of wound litigation, perhaps forever.

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